What Lies in the Furthest Reaches of Hawai'i Volcanoes National Park?

In 2011, the Inventory and Monitoring (I&M) vegetation team monitored wet forest and subalpine shrubland plant communities in the Kahuku unit of Hawai'i Volcanoes National Park (HAVO). The extensive pasture, wet forest, woodland, subalpine shrubland, lava flow, and cinder field plant communities found within Kahuku offer both unique opportunities and challenges for resource managers.

Few vegetation studies have been conducted in Kahuku and none have monitored plant community dynamics. A baseline inventory survey by HAVO staff (2006) identified important regions with rare native plants and regions with invasive plants. These data aided resource managers in the initial development of management priorities, but long-term plant community monitoring data are needed to quantify future changes and assess the effectiveness of management practices.

The I&M vegetation crew spent the past six months monitoring 60 plots (20 x 50 m each) in wet forest and subalpine shrubland communities of Kahuku. Field crews worked closely with HAVO staff to ensure employee safety during feral ungulate hunts, protect archeological resources, and coordinate fieldwork.

In July, a group of HAVO and I&M staff flew to the remote northwest corner of Kahuku (6,900 ft) via helicopter. During this trip, an endangered parsley (*Spermolepis hawaiiensis)*, rare endemic fern *(Polystichum haleakalense)*, rare seasonal endemic stinging nettle (*Hesperocnide sandwicensis)*, and seven non-native herbaceous species new to Kahuku were documented. The identification of certain rare species in this section of Kahuku warranted immediate management action (see sidebar on the far right).

Like most of Kahuku, this area continues to be significantly impacted by grazing, ground disturbance, and soil compaction from ungulates such as cattle, mouflon, sheep, and pigs. The extent of this impact is evident by the remnant vegetation composition. Before these mammals were present, this area was a native woodland dominated by naio (*Myoporum sandwicense*) and māmane (*Sophora chrysophylla*) trees with diverse native shrubs and grasses in the understory. Although some of the older trees are still present, there are few young trees to take their place. Furthermore, a groundcover of mostly non-native herbs now blankets large sections of the landscape.

Monitoring data from rarely visited areas of the park such as the northwest corner of Kahuku provide park managers with an important glimpse at the condition of these remote vegetation communities. These data provide a basic understanding of the amount and types of plant species in each part of the forest as well as identify new and rare species. Monitoring data also provide a way for park managers to compare different regions of forest or shrublands throughout the park and region.

The I&M vegetation team will continue to collaborate with park staff on field excursions to pool resources, and ensure prompt data sharing. All field data and summary reports for HAVO will be available this spring. The I&M team is gearing up for an exciting field season in the wet forests of Haleakalā NP and Kalaupapa NHP in 2012.

The only realistic way to access the remote northwest corner of Kahuku is by helicopter.

The I&M vegetation team surveys a plot through former pastureland. Non-native grasses carpet the ground.

–C. Yanger, NPS
Biological Technician
–A. Ainsworth, NPS
Botanist

A lone māmane tree symbolizes the havoc that grazing animals have on native ecosystems. Saplings have been quickly eaten for generations, leaving only the older, gnarled trees. Once these trees die, will there be any more māmane?

Kahuku Plant Highlights

The native Hawaiian fern *Polystichum haleakalense* was found within the subalpine shrubland community on Mauna Loa volcano within Hawai'i Volcanoes National Park. Prior to this collection, *P. haleakalense* was only known from Haleakalā and Mauna Kea volcanoes. Ka'upu (*Polystichum hillebrandii*), a rare fern to the park was also recorded. These ferns represent two of the three endemic *Polystichum* species found in Hawaii.

This rare native Hawaiian fern, *Polysitichum haleakalense,* was found in Kahuku.

USGS photo

The māmane (*Sophora chrysophylla*) -naio (*Myoporum sandwicense*) woodland community in the northwest corner of Kahuku is rare in the park and highly threatened by feral goats, sheep, and pigs. The loss of māmane trees from feral animals in similar woodlands on Mauna Kea is thought to be the primary reason the palila (*Loxioides bailleui*), a Hawaiian honeycreeper, is critically endangered. Today, palila are restricted to less than 10% of their historical range and the park's māmane-naio woodland represents a potential new introduction site.

A number of new non-native herbs were documented in Kahuku. These naturalized herbs present yet another threat to the remaining native plant communities:

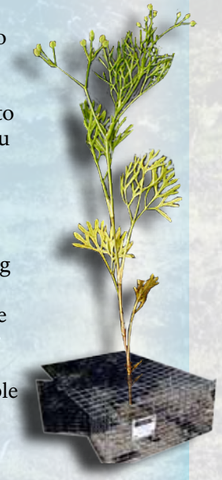
- lesser swinecress (*Coronopus didymus*)
- alfilaria (*Erodium cicutarium*)
- corn speedwell (*Veronica arvensis*)
- necklace weed (*Veronica peregrina*)
- *Achyranthes aspera*
- American carrot (*Daucus pusilis)*
- small-flowered catchfly (*Silene gallica)*

A large patch of pōpolo kū mai (*Phytolacca sandwicensis*) was found just outside of a monitoring plot within the former pasture section of Kahuku. Pōpolo kū mai is rare to the park and this patch is particularly important because it will serve as a critical seed source for resource management's ongoing wet forest reforestation efforts.

This patch of pōpolo kū mai (*Phytolacca sandwicensis*) is a rare and exciting find.

The Story of an Endangered Garnish?

Last July, while in the field with the Inventory & Monitoring vegetation monitoring team conducting surveys in the remote northwest region of Kahuku, we found a single *Spermolepis hawaiiensis*. This plant is a federally listed endangered species in the parsley family (although not the kind sprinkled on pasta) that had not been seen in Hawai'i Volcanoes National Park since 1944. Known only from a single collection (Fagerlund & Mitchell 557) within the historical section of HAVO, this species was presumed to have been eliminated from the park.



In September, two HAVO resource managers and myself flew back to northwest Kahuku and erected a small exclosure around the plant to protect it from non-native grazing animals. While the plant has since died (*Spermolepis* are annual), park managers were able to collect seeds for propagation. We are hopeful that with the protection from the exclosure, a new population will establish and this rare species will once again be found within Hawai'i Volcanoes National Park.

–M. Wasser, NPS-HAVO
Botanical Field Technician

Note: Above photos of Spermolepis and exclosure are not to scale